

OLT-2300

GEPON Optical Line Terminal

User's Guide

Version 1.00

10/2007

Edition 1



About This User's Guide

Intended Audience

This manual is intended for people who want to install and maintain the OLT-2300 GEAPON (Gigabit Ethernet Passive Optical Network) Optical Line Terminal. This User's Guide gives hardware installation, connection and maintenance instructions. It also gives specifications.

Related Documentation

- OLC-2301 Line Card User's Guide
This User's Guide provides hardware connection details and gives detailed information about the line card features and hardware.
- OMC-2301 Management Card User's Guide
This User's Guide provides hardware connection details and configuration and management instructions for the management card.
- Supporting Disk
Refer to the included CD for support documents.
- ZyXEL Web Site
Please refer to www.zyxel.com for additional support documentation and product certifications.

User Guide Feedback

Help us help you. Send all User Guide-related comments, questions or suggestions for improvement to the following address, or use e-mail instead. Thank you!

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Document Conventions

Warnings and Notes

These are how warnings and notes are shown in this User's Guide.



Warnings tell you about things that could harm you or your device.



Notes tell you other important information (for example, other things you may need to configure or helpful tips) or recommendations.

Naming Conventions

- OLT-2300 refers to the main chassis and its cards. The OLT-2300 may be referred to as the “OLT-2300”, the “system”, or the “device”.
- The OLT-2300M is the OLT-2300 main chassis. It may be referred to as the “main chassis”.
- The OMC-2301 GEAPON OLT Management Card may be referred to as the “management card” or the “OMC”.
- The OLC-2301 GEAPON OLT Line Card may be referred to as the “line card” or the “OLC”.
- The OPA-2300 is the power card. It may be referred to as the “power card”.
- The OFC-2300 is the fan module. It may be referred to as the “fan module”.

Icons Used in Figures

Figures in this User's Guide may use the following generic icons. The OLT-2300 icon is not an exact representation of your device.

OLT-2300 	Computer 	Server 
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Switch 	Router 	Internet 
Central Office/ISP 	ONU 	Splitter 

Safety Warnings



For your safety, be sure to read and follow all warning notices and instructions.

For your safety, be sure to read and follow all warning notices and instructions.

- Ground yourself (by properly using an anti-static wrist strap for example) whenever working with the device's hardware or connections.
- Do NOT use this product near water, for example, in a wet basement or near a swimming pool.
- Do NOT expose your device to dampness, dust or corrosive liquids.
- Do NOT store things on the device.
- Do NOT install, use, or service this device during a thunderstorm. There is a remote risk of electric shock from lightning.
- Warning! Connect the frame ground before you connect any other cables or wiring. Refer to [Chapter 5 on page 41](#) for the ground wire gauge.
- Connect ONLY suitable accessories to the device.
- ONLY qualified service personnel should service or disassemble this device.
- Make sure to connect the cables to the correct ports.
- Place connecting cables carefully so that no one will step on them or stumble over them.
- Always disconnect all cables from this device before servicing or disassembling.
- Use ONLY a power wire of the appropriate wire gauge (see [Chapter 5 on page 41](#) for details) for your device. Connect it to a power supply of the correct voltage (see [Chapter 5 on page 41](#) for details).
- Do NOT allow anything to rest on the power adaptor or cord and do NOT place the product where anyone can walk on the power adaptor or cord.
- Do NOT use the device if the power adaptor or cord is damaged as it might cause electrocution.
- If the power adaptor or cord is damaged, remove it from the device and the power source.
- Do NOT attempt to repair the power adaptor or cord. Contact your local vendor to order a new one.
- Do not use the device outside, and make sure all the connections are indoors. There is a remote risk of electric shock from lightning.
- Do NOT obstruct the device ventilation slots, as insufficient airflow may harm your device.
- Fuse Warning! Replace a fuse only with a fuse of the same type and rating.
- Warning! To avoid risk of electric shock, remove only one card at a time and do not place fingers or objects inside the chassis. Cover empty slots with slot covers.
- The length of exposed (bare) power wire should not exceed 10 mm.

- Fan Module Warning! Use the fan module handle when pulling out or pushing in the fan module. Be careful not to put fingers or objects inside the fan module.
- Energy Hazard Warning! Remove all metal jewelry, watches, and so on from your hands and wrists before serving this device.

This product is recyclable. Dispose of it properly.



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PART I

Introduction

System Introduction (19)

System Introduction

This chapter introduces the OLT-2300 and its applications.

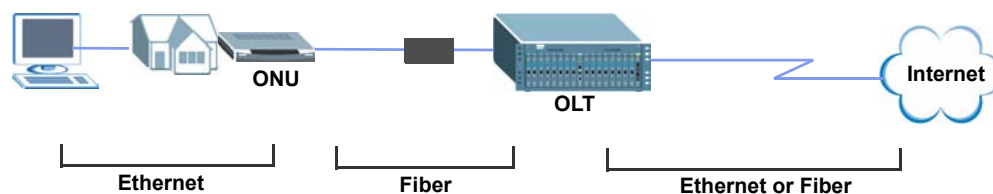
1.1 System Description

The OLT-2300 is a manageable optical line terminal, which is capable of providing network access to customers at distances up to 20 km (depending on the built-in transceivers on the line card and the ONU (Optical Network Unit)).

The OLT-2300 allows service providers to easily implement FTTH (Fiber To The Home) service offering reliable high-speed network access to their subscribers over optical fiber through ONUs.

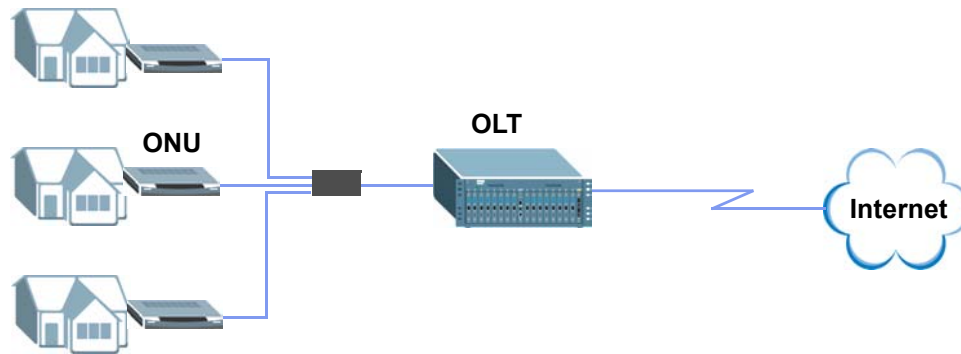
The following shows an example network.

Figure 1 Network Example

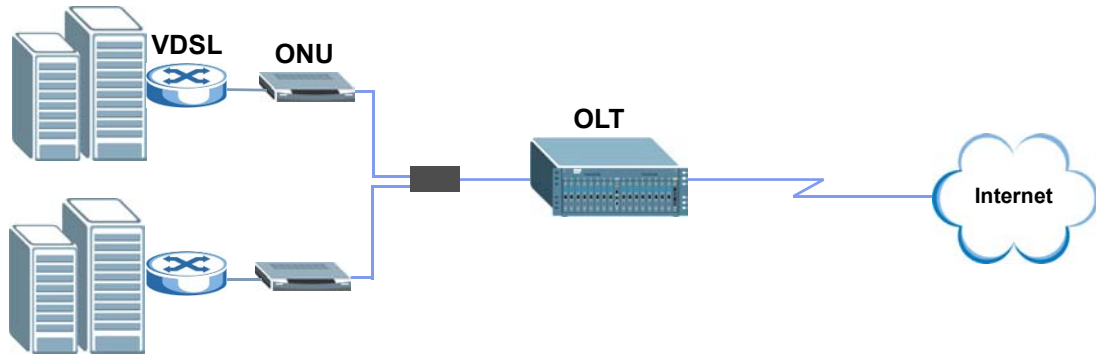


1.2 Applications

In the following figure shows an FTTH (Fiber to the Home) examples using the OLT-2300. The OLT-2300 is located at the Central Office (CO) and connected to the Internet. Three ONUs at the residential homes connect to a fiber port on the OLT-2300 through a fiber splitter.

Figure 2 FTTH Network Example

In the following FTTB (Fiber To The Building) example, the OLT-2300 provides Internet access for tenants in the two buildings through a fiber connection.

Figure 3 FTTB Network Example

1.3 Hardware Overview

The OLT-2300 system includes the following:

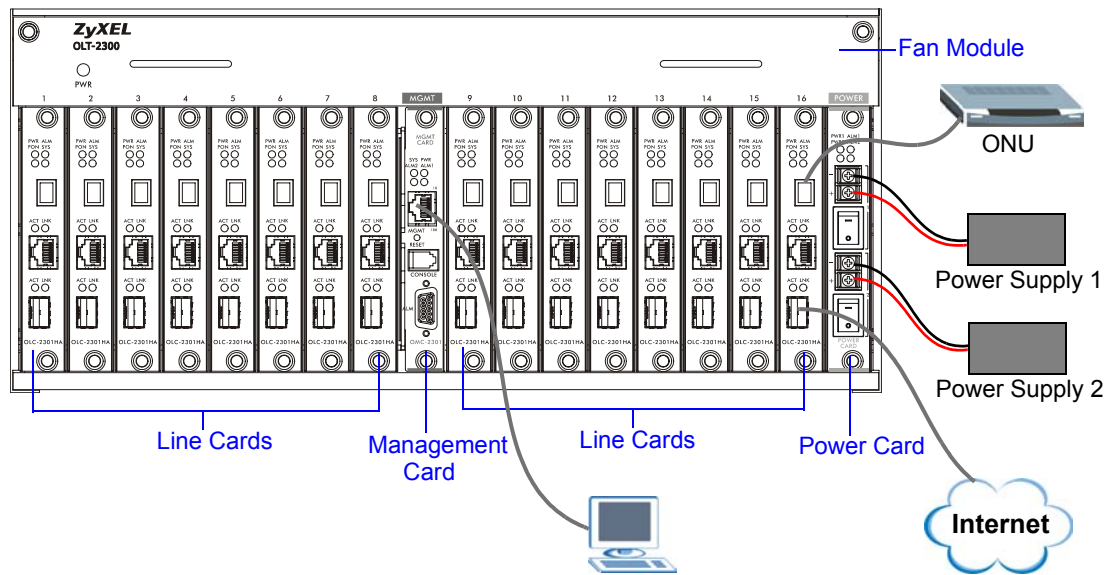
- Management Card
- Line Card(s)
- Power Card
- Fan Module

The OLT-2300M can hold a maximum of sixteen line cards. With fiber splitters, up to 512 subscribers can simultaneously utilize a wide range of powerful broadband services through fiber connections. The management card and line cards are hot-swappable; thus, you do not need to turn off the service of other cards to change or service an individual card. A single management card can provide the convenience of centralized network traffic supervision.

The OLT-2300 also has a power card that can connect to two power supplies simultaneously for power redundancy. This reduces the chance of a system shutdown.

The following figure shows the front panel of the OLT-2300 with cards installed. It also shows some connections.

Figure 4 OLT-2300 Front Panel



PART II

Installation and Connections

Hardware Installation and Connections (25)

Hardware Installation and Connections

This chapter describes how to install and connect the OLT-2300 and cards.

2.1 General Installation Instructions

Perform the installation as follows:

- Make sure the power card's power switches are in the **OFF** position.
- Install the main chassis as detailed in this chapter.
- If the management card, power card or line cards are not already installed, follow the procedure in the next section to install them.
- Refer to [Section 2.4 on page 30](#) for instructions on making power connections and turning on the OLT-2300.

2.2 Main Chassis Installation

This section explains how to install the main chassis on a rack. Alternatively, you can install the main chassis on a desktop.

2.2.1 Rack-mounted Installation Requirements

Make sure the rack will safely support the combined weight of all the equipment it contains.



Make sure the position of the OLT-2300M does not make the rack unstable or top-heavy. Take all necessary precautions to anchor the rack securely before installing the unit.

- Use a #2 Phillips screwdriver to install the screws.
- Refer to [Chapter 5 on page 41](#) for the gauge of wire to use for the frame ground connections.
- Refer to [Chapter 5 on page 41](#) for the OLT-2300's dimensions, weights and power consumption.



Failure to use the proper screws may damage the unit.

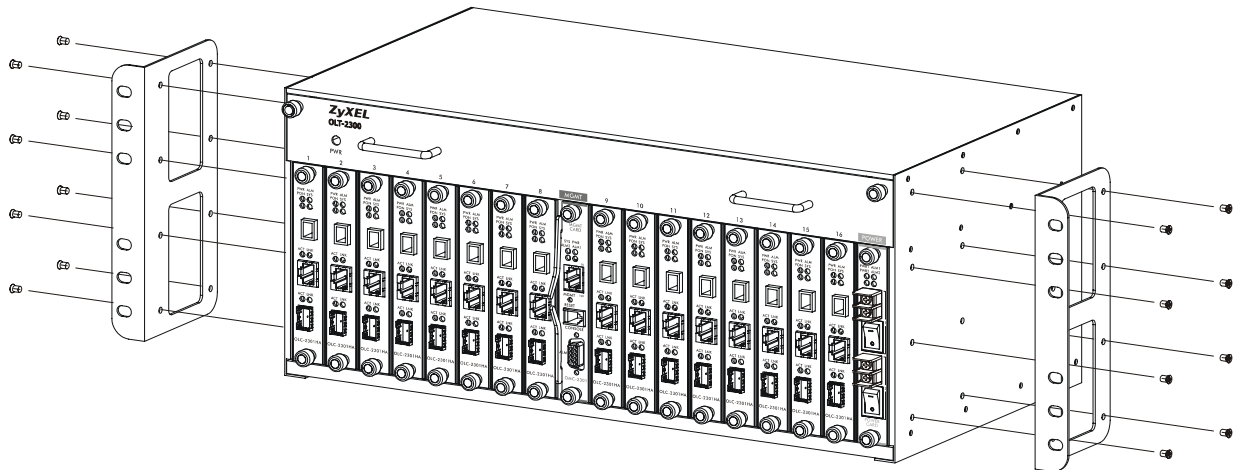
2.2.2 Mounting the OLT-2300M on a Rack

Make sure that nothing obstructs the airflow of the main chassis.

Use the following procedure to install the main chassis in the rack.

- 1 Position a mounting bracket on one side of the chassis, making sure the screw holes on the bracket are on the same side as the front panel of the main chassis.
- 2 Use the screwdriver to install the screws through the mounting bracket holes into the main chassis.
- 3 Repeat steps 1-2 to attach the second mounting bracket on the other side of the main chassis.

Figure 5 Attaching Mounting Brackets to the Main Chassis



- 4 Position a mounting bracket (that is already attached to the main chassis) on one side of the rack, lining up the screw holes on the bracket with the screw holes on the side of the rack.
- 5 Use the screwdriver to install the screws through the mounting bracket holes into the rack.
- 6 Repeat steps 4-5 to attach the second mounting bracket on the other side of the rack.

2.3 Card Installation

This section shows you how to install and remove the management card, line cards and power card.

- Install the management card in the **MGMT** slot on the OLT-2300.
- Install the power card in the **POWER** slot on the OLT-2300.
- Install the line cards in the OLT-2300 in the other slots.

- Leave the slot covers on unused slots.

2.3.1 Installing a Card

Use the following procedure to install the management card, line cards or the power card in the main chassis.

- 1 Remove the slot cover.
- 2 Grasp the center of the front panel of the card with one hand and place the other hand under the card to support it.
- 3 For the management card, insert the card halfway into the slot and spread the two ejector levers outward. Make sure the ejector levers are perpendicular to the front panel.
- 4 Slide the card into the slot until it makes contact with the backplane. The ejector levers on the management card should be at a small angle to the front panel now.
- 5 Push the two ejector levers firmly until they are flush with the front panel.
- 6 Tighten the two thumbscrews.

Figure 6 Installing a Card

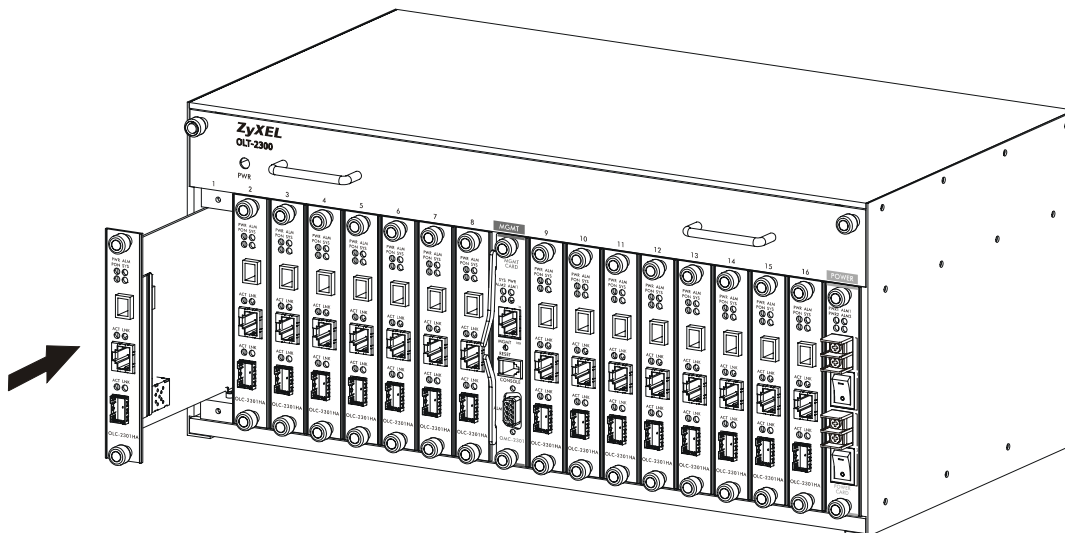
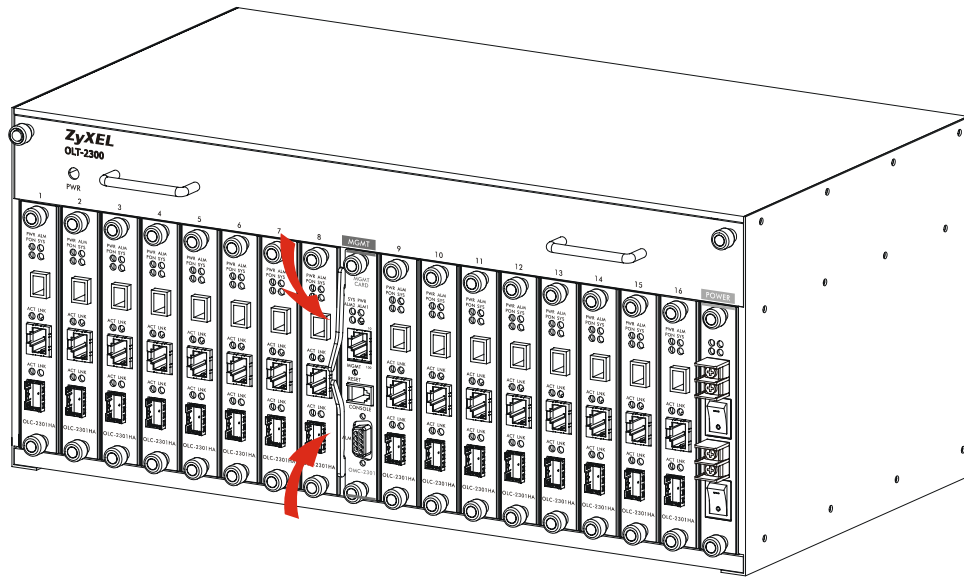
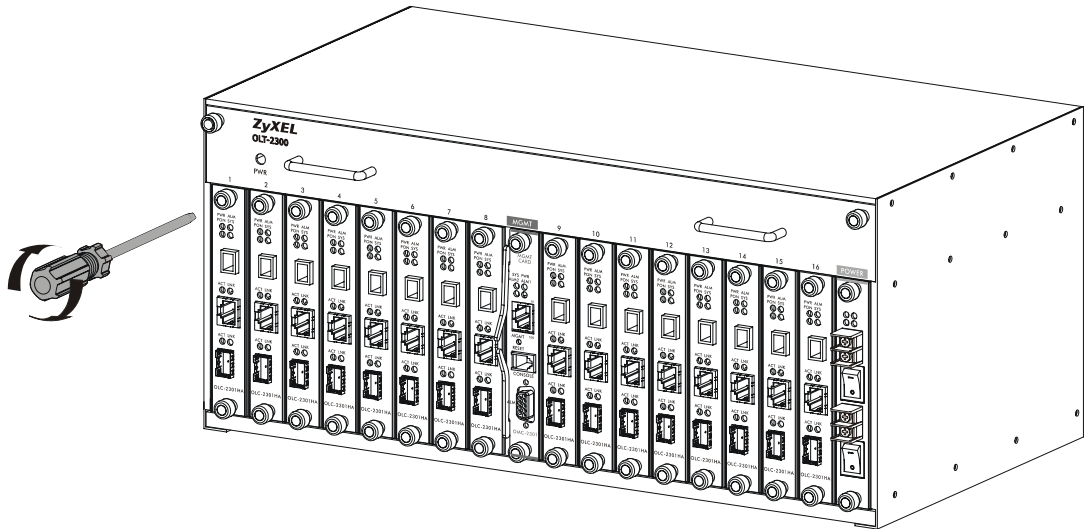


Figure 7 Closing the Ejector Levers (Management Card Only)**Figure 8** Tightening Card Thumbscrews

2.3.2 Removing a Card

Use the following procedure to remove the management card, line cards or the power card from the main chassis.

- 1 Disconnect all cables from the card.
- 2 Loosen the two thumbscrews.
- 3 For the management card, pull the two ejector levers firmly until the front of the card is clear of the main chassis. Pull the ejector levers until they are perpendicular to the front panel.
- 4 Grasp the center of the front panel of the card with one hand and place the other hand under the card to support it.
- 5 Slide the card out of the slot.

Figure 9 Loosening Card Thumbscrews

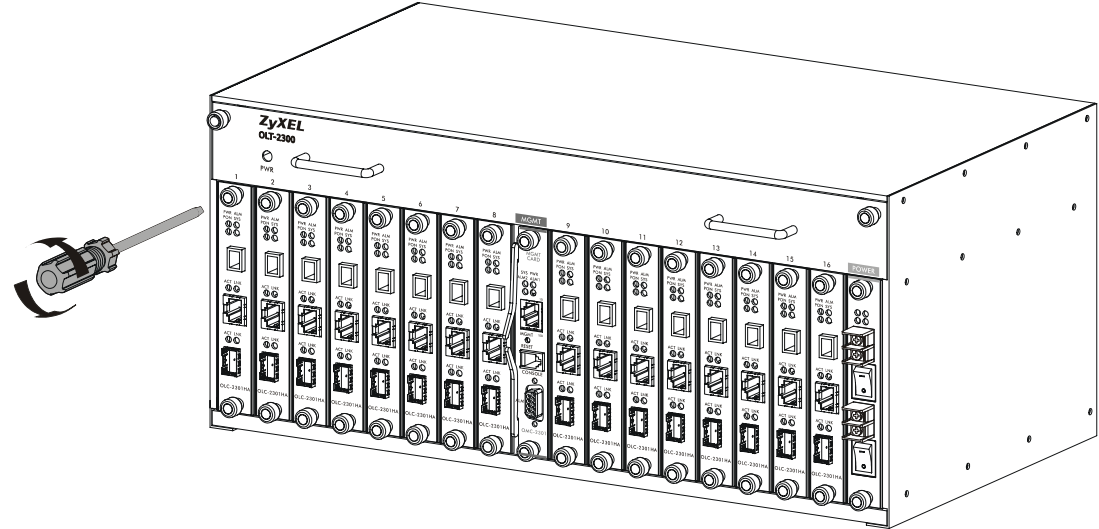


Figure 10 Opening the Ejector Levers (Management Card Only)

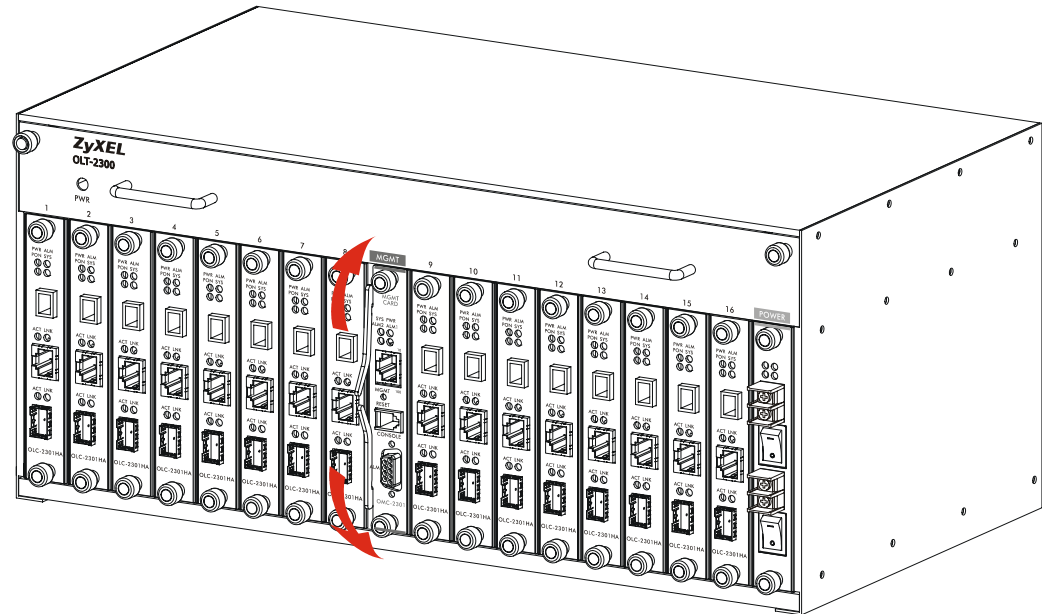
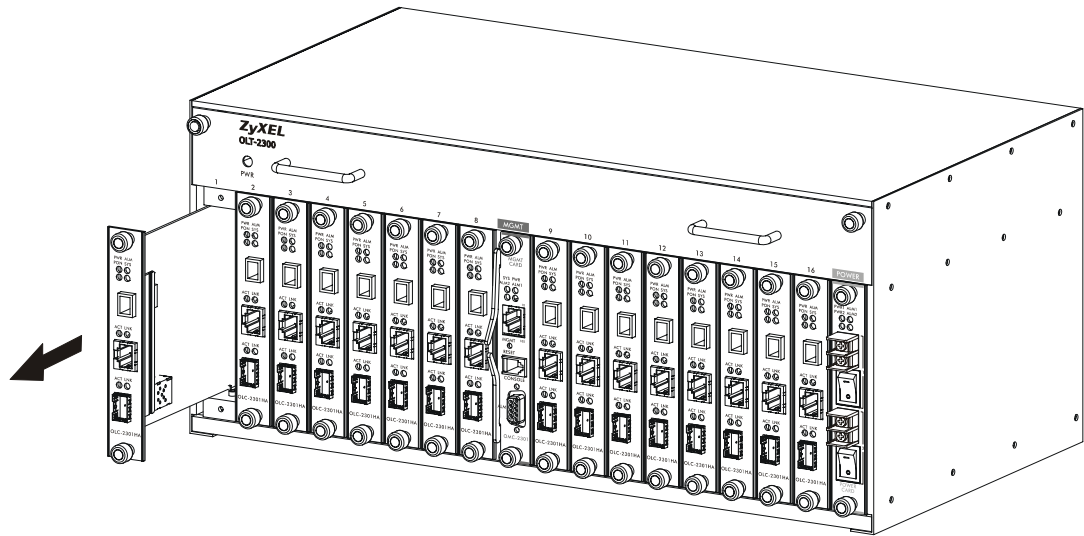


Figure 11 Removing a Main Chassis Card

2.4 Power Connections

Use the following procedures to connect the OLT-2300 to a power source after you have installed the main chassis in a rack.



Refer to [Chapter 5 on page 41](#) for power requirements and make sure you are using an appropriate power source.

Observe the following before you start:

- Refer to [Chapter 5 on page 41](#) for the gauge of wire to use for the OLT-2300 power connections.
- Keep the OLT-2300 power switches in the off (o) position until you come to procedure for turning on the power.
- Keep the power supply switch in the off (o) position until you come to procedure for turning on the power.



Use only power wires of the required diameter for connecting the OLT-2300 to a power supply (refer to [Chapter 5 on page 41](#) for the required wire gauge).

2.4.1 Power Connections

The main chassis uses a power card which can connect to two power supplies.

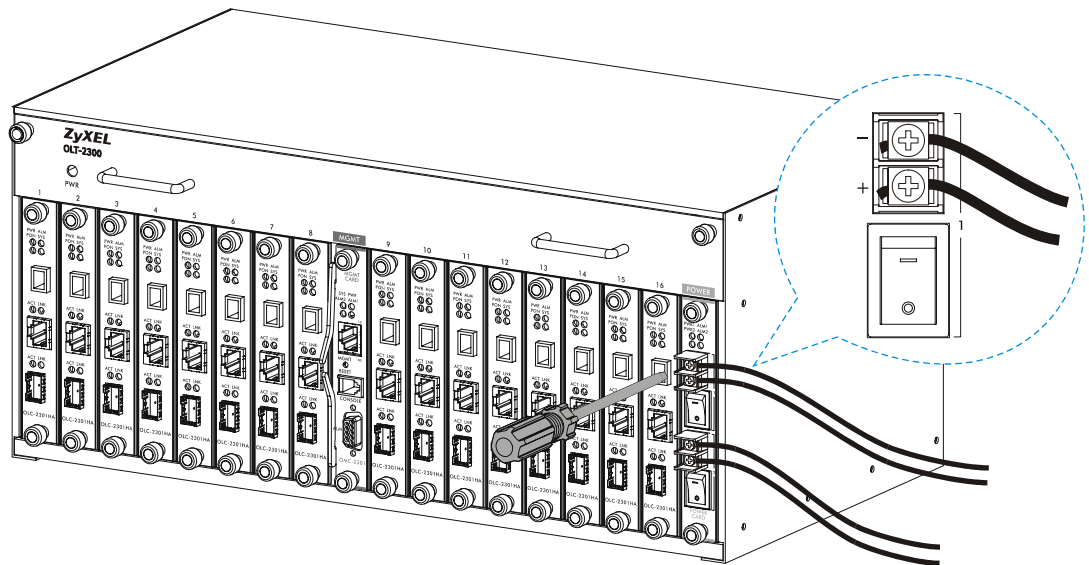
The power connections are on the front of the power card. The power card is in the **POWER** slot of the main chassis.

2.4.1.1 Procedure to Connect the Power

Use two wires to connect to each power supply, one wire for the positive terminal and one wire for the negative terminal.

- 1 Open the cover for the power terminals.
- 2 Loosen the screw of the first negative power terminal on the front of the power card.
- 3 Put a power wire under the screw head and nut.
- 4 Loop the power wire around the terminal screw thread, and tighten the screw.
- 5 Connect the other end of the power wire to the negative terminal on the power supply.
- 6 Connect a power wire to the positive power terminal on the front of the OLT-2300 power card, and tighten the terminal screw.
- 7 Connect the other end of the power wire to the positive terminal on the power supply.
- 8 Repeat the previous steps for the second power supply.

Figure 12 Connecting the Power Wires to the OLT-2300 Power Card

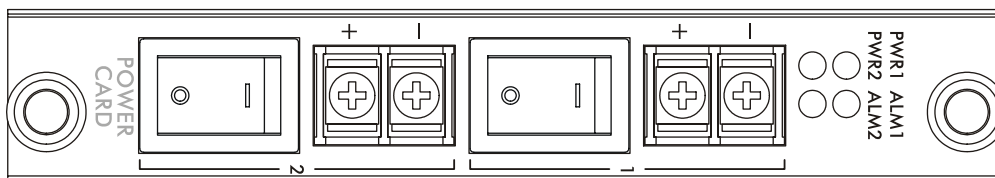


2.4.2 Procedure to Turn on the OLT-2300 Power

- 1 Turn on the power supply which is connected to the power card.
- 2 Move the power switch on the power card to the on (-) position.

2.4.3 Power Card LEDs

The figure below shows the front panel of the power card.

Figure 13 Power Card Front Panel

The following table describes the LED indicators on the front panel of the power card.

Table 1 Power Card LED Descriptions

LED	COLOR	STATUS	DESCRIPTION
PWR1/2	Green	On	The system is receiving power from the connected power supply.
		Off	The system is not receiving power from the connected power supply.
ALM1/2	Red	On	The corresponding power rail on the power card is not ready or there is a malfunction.
		Off	The corresponding power rail on the power card is functioning normally.

PART III

Maintenance, Troubleshooting and Specifications

Maintenance (35)

Hardware Troubleshooting (39)

Product Specifications (41)

Maintenance

This chapter describes how to perform maintenance on the system hardware.

3.1 Fan Maintenance

This section describes how to change a fan fuse or a fan module on the OLT-2300.

3.1.1 Procedure to Remove and Install the Fan Module

The OLT-2300M has a hot-swappable fan module. The fan module is located above the slots on the front panel. Replace the entire fan module if the fuse is not the problem. Return any malfunctioning fan modules to the manufacturer.

Perform the following procedure to remove the fan module in order to change a fan fuse or the fan module.

- 1 Loosen the thumbscrews on the front of the fan module.
- 2 Slide out the fan module.
- 3 Replace the fuse if it is burnt out (see [Chapter 5 on page 41](#) for fuse information). If the fuse is not the problem, use a different OFC-2300 fan module from the manufacturer.
- 4 Slide the fan module back into the fan module slot.
- 5 Tighten the thumbscrews.

Figure 14 Loosen the Thumbscrews on the OLT-2300 Fan Module

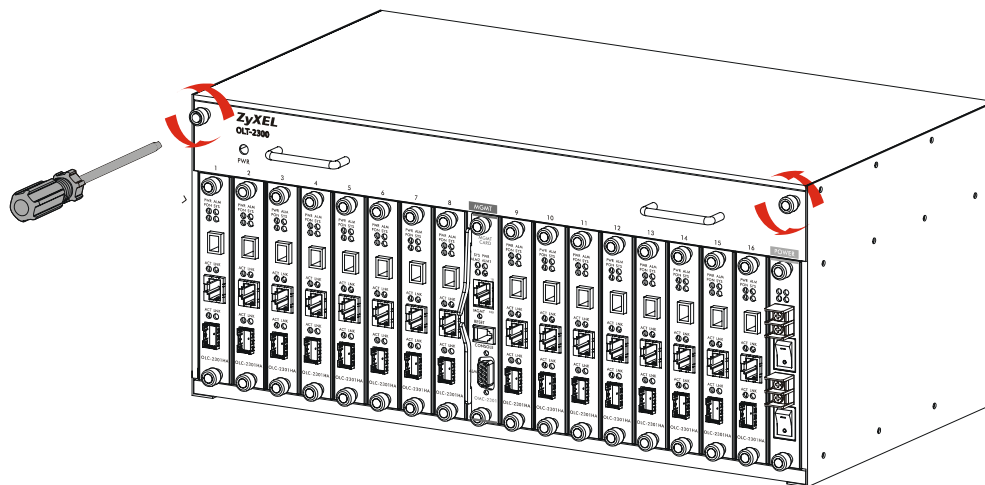
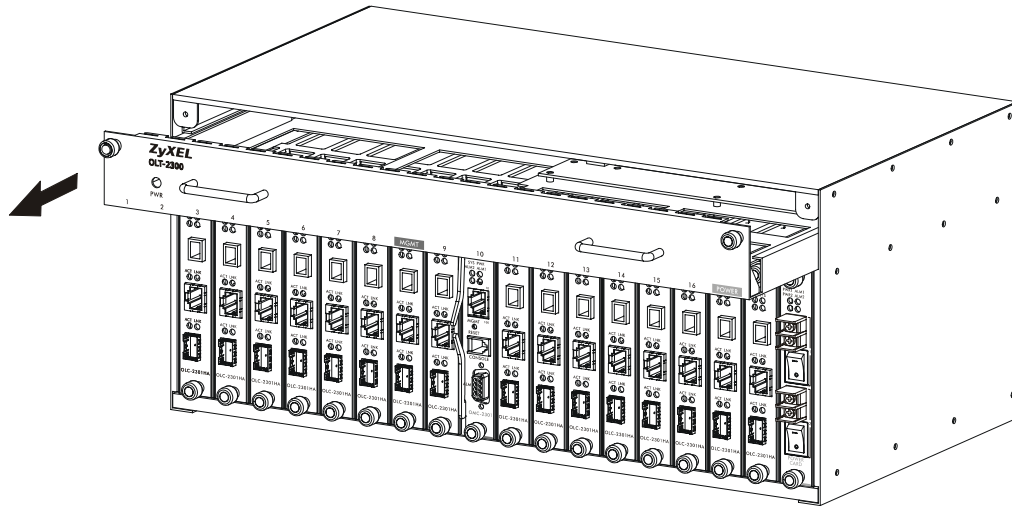
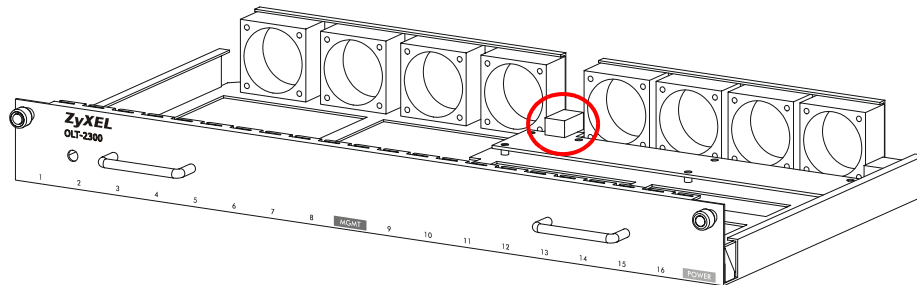


Figure 15 Remove the OLT-2300 Fan Module**Figure 16** OLT-2300 Fan Module (Location of Fuse Indicated)

3.2 Power Maintenance

This section describes how to change the power supply modules connected to the power card. The power modules have a built-in circuit breaker.

3.2.1 Procedure to Disconnect the Power

You can disconnect the power supplies from the power card individually.

- 1 Make sure that the power switch for the power supply you want to disconnect is in the off (o) position on the power card.
- 2 Turn off the power supply.
- 3 Disconnect the power supply's power cord.

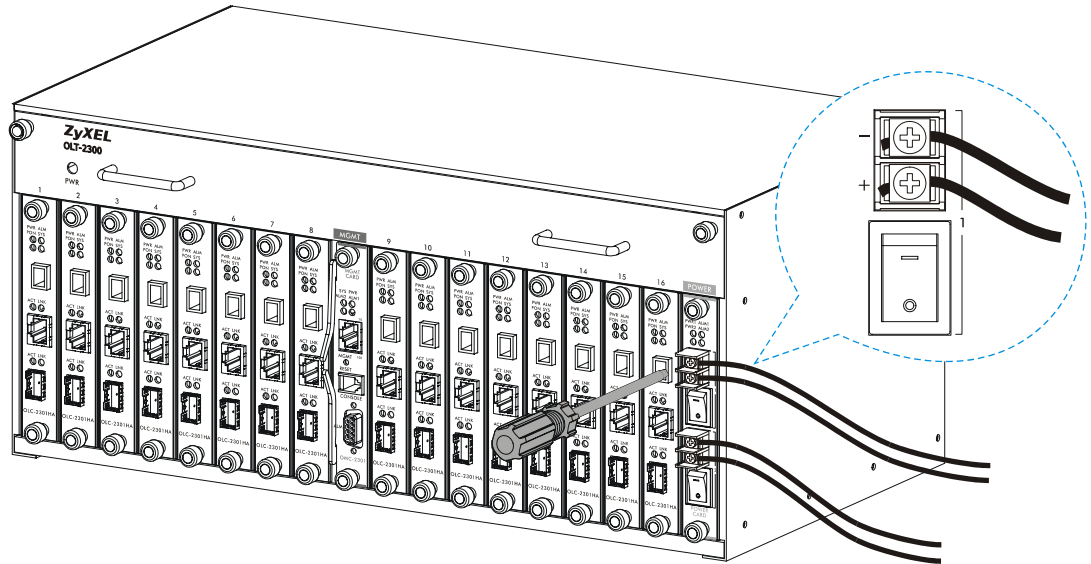
3.2.2 Procedure to Change a Power Supply

Use the following procedure to change a power supply.

- 1 Refer to [Section 3.2.1 on page 36](#) to disconnect the power before you begin.
- 2 Loosen the screws of the power terminals on the power card.
- 3 Disconnect the power wires from the power supply's power terminals.

- 4 Replace the power supply.
- 5 Connect the power wires of the new power supply to the OLT-2300 power card's power terminals.
- 6 Tighten the power terminals screws.
- 7 Refer to [Section 3.2.3 on page 37](#) to reconnect the power after you finish.

Figure 17 Connecting the Power Wires to the OLT-2300 Power Card



3.2.3 Procedure to Reconnect the Power

- 1 Reconnect the power cable to the power supply.
- 2 Turn the power supply back on.
- 3 Turn the switch for the power supply back to the on (-) position on the power card.

Hardware Troubleshooting

This chapter explains how to troubleshoot the system hardware.

4.1 The Fan Module PWR LED Does Not Turn On or Is Blinking

The **PWR** light on the fan module blinks if the input power for the fans is not stable and is off if there is no input power. The **PWR** light stays on if the input for the fans is normal.

- 1 Make sure the power wires are properly connected to the power supply and the power supply is operating normally. Make sure you are using the correct power source (refer to [Chapter 5 on page 41](#)). Make sure the power supplies are turned ON. Refer to [Section 3.2 on page 36](#).
- 2 The LED itself, the fan module, or the unit may be faulty; contact your vendor.

4.2 The Management Card ALM1 LED Is On

If the **ALM 1** LED of the management card is on, at least one fan may have failed in the fan module. Working fans emit a low buzz and blow air. Use the **System info** screen or the `show hardware-monitor` command on the management card to check if the fan speed falls below the threshold. If the fans are not working properly, refer to [Section 3.1 on page 35](#) for instructions on changing a fuse or changing the fan module.

Product Specifications

This appendix lists system features and provides detailed system specifications. See the User's Guides for individual line cards for information on card features, settings and hardware.

Features

The following table lists key OLT-2300 features.

Table 2 Features

FEATURE	DESCRIPTION
Slots	The OLT-2300M has slots for a power card and line cards, a fan module and a management card.
Backplane	Connect the cards to the backplane. The backplane is the inside rear panel of the OLT-2300M.
Line Cards	The OLT-2300 uses up to 16 line cards.
Management Card	The OLT-2300 accommodates a management card that maintains the line cards and performance counters.
Fan Module	The OLT-2300 is equipped with a fan module to provide easy maintenance, greater reliability and increased system operating lifetimes.
Power Card	The OLT-2300 has one power card that can connect to two power supply modules. One power supply module is redundant. The OLT-2300 can be fully powered by just one power supply module so the system can keep running while you replace a failed power supply module.
Alarm Port	The OLT-2300 has three alarm input and one alarm output terminal to connect to other pieces of equipment.
Scalable Platform for Future Expansion	The flexible design of the OLT-2300 allows service providers to start with minimum cost. As the number of users and applications increases, additional line cards can be added to support more subscribers.

System Specifications

This section provides the specifications for the OLT-2300.

Main Chassis Physical Specifications

The OLT-2300M is 19-inch (482.6 mm) or 23-inch (584.2 mm) rack-mountable.

See the following table for the number of slots in the main chassis as well as how many are for line cards, the management card or the power card.

Table 3 Main Chassis Slots

CHASSIS	TOTAL	FOR LINE CARDS	FOR OMC	FOR POWER CARD
OLT-2300M	18	16	1	1

Main Chassis Dimensions and Weight

This table describes the OLT-2300M dimensions and weight (including fan module weight; excluding card weights).

Table 4 Main Chassis Dimensions and Weights (Without Cards)

CHASSIS	DIMENSIONS	#U	WEIGHT
OLT-2300M	436 mm (W) x 232 mm (D) x 192 mm (H)	4U	?? kg

Wire Gauge Specifications

This table describes the wire gauge specifications of the OLT-2300.



Make sure you use wires of the specified wire gauge

Table 5 Wire Gauge Specifications

WIRE TYPE	REQUIRED AWG NO. (DIAMETER)
Ground Wire	10 or larger
Telephone Wire	26 or larger
Power Wire	18 or larger

AWG (American Wire Gauge) is a measurement system for wire that specifies its thickness. As the thickness of the wire increases, the AWG number decreases.

Power Specifications

This table describes the maximum power consumption of the OLT-2300.

Table 6 Power Specifications

CONSUMPTION IN WATTS	VOLTS DC	AMPS
200	-36 to -72	3 ~ 5

There is no tolerance for the input voltage.

Operating Environment

- Temperature: 0°C ~ 50°C
- Humidity: < 90% RH (non-condensing)

Storage Environment

- Temperature: -25°C ~ 70°C
- Humidity: < 95% RH (non-condensing)

Fan Module

This table describes the fan module specifications of the OLT-2300.

Table 7 Fan Module Specifications

UNIT	NUMBER OF FANS	FAN DIMENSIONS	UNIT DIMENSIONS
OFC-2300	8	40 mm (W) x 40 mm (D) x 20 mm (H)	432 mm (W) x 231 mm (D) x 44 mm (H)

Fan Mechanical Operation

- Safe design: All fans have rotor-locking protection to prevent damage to wiring and electrical components. The fan rotors will lock when fan movement is physically obstructed.
- Locked rotor protection: No damage will occur when the fan rotors are locked for 72 continuous hours. After this amount of time, damage to the fans may occur. The fans will automatically restart as soon as the physical obstruction is removed.
- Polarity protection: A reverse-polarity voltage connection will not cause damage. After the polarity is corrected, the fan will restart automatically.
- Insulation resistance: There should be more than 10M ohms of resistance between the housing and the terminal at 500 VDC.

Fuse Ratings

This table describes the fuse ratings of the OLT-2300.

Table 8 Fuse Ratings

UNIT	NUMBER OF FUSES	TYPE	AMPS	VOLTS AC	DIMENSIONS
OMC-2301 OLC-2301 OFC-2300	1	T (Slow-blow)	1	125	2.7 mm x 2.7 mm x 6.1 mm

Power Card

This section provides details about the power card.

- Dual sets of 36 ~ 72 VDC input
- Built-in surge protection
- Rated Voltage 48.0 VDC
- Operating Voltage: 36 ~ 72 VDC
- Full load power consumption: 150 W

Certifications

This section lists the OLT-2300 certifications.

- Safety
 - IEC60950-1 (no CB report)
 - EN 60950-1 for Europe
 - UL 60950-1 for USA
 - CSA No. 22.2 Std. 60950-1 for Canada
 - Compliant to Class 1 for laser safety according to IEC 825-2.
- EMC
 - FCC Part 15 Class A
 - CE-EMC Class A
 - VCCI class A

PART IV

Appendices and Index

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Legal Information

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Certifications

Federal Communications Commission (FCC) Interference Statement

This device complies with Part 15 of FCC rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operations.

FCC Warning

This device has been tested and found to comply with the limits for a Class A digital switch, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial environment. This device generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this device in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CE Mark Warning:

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Taiwanese BSMI (Bureau of Standards, Metrology and Inspection) A Warning:

警告使用者
這是甲類的資訊產品，在居住的環境使用時，
可能造成射頻干擾，在這種情況下，
使用者會被要求採取某些適當的對策。

Notices

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

CLASS 1 LASER PRODUCT

APPAREIL A LASER DE CLASS 1

PRODUCT COMPLIES WITH 21 CFR 1040.10 AND 1040.11.

PRODUIT CONFORME SELON 21 CFR 1040.10 ET 1040.11.

Viewing Certifications

- 1 Go to <http://www.zyxel.com>.
- 2 Select your product on the ZyXEL home page to go to that product's page.
- 3 Select the certification you wish to view from this page.

ZyXEL Limited Warranty

ZyXEL warrants to the original end user (purchaser) that this product is free from any defects in materials or workmanship for a period of up to two years from the date of purchase. During the warranty period, and upon proof of purchase, should the product have indications of failure due to faulty workmanship and/or materials, ZyXEL will, at its discretion, repair or replace the defective products or components without charge for either parts or labor, and to whatever extent it shall deem necessary to restore the product or components to proper operating

condition. Any replacement will consist of a new or re-manufactured functionally equivalent product of equal or higher value, and will be solely at the discretion of ZyXEL. This warranty shall not apply if the product has been modified, misused, tampered with, damaged by an act of God, or subjected to abnormal working conditions.

Note

Repair or replacement, as provided under this warranty, is the exclusive remedy of the purchaser. This warranty is in lieu of all other warranties, express or implied, including any implied warranty of merchantability or fitness for a particular use or purpose. ZyXEL shall in no event be held liable for indirect or consequential damages of any kind to the purchaser.

To obtain the services of this warranty, contact ZyXEL's Service Center for your Return Material Authorization number (RMA). Products must be returned Postage Prepaid. It is recommended that the unit be insured when shipped. Any returned products without proof of purchase or those with an out-dated warranty will be repaired or replaced (at the discretion of ZyXEL) and the customer will be billed for parts and labor. All repaired or replaced products will be shipped by ZyXEL to the corresponding return address, Postage Paid. This warranty gives you specific legal rights, and you may also have other rights that vary from country to country.

Registration

Register your product online to receive e-mail notices of firmware upgrades and information at www.zyxel.com for global products, or at www.us.zyxel.com for North American products.

Customer Support

Please have the following information ready when you contact customer support.

Required Information

- Product model and serial number.
- Warranty Information.
- Date that you received your device.
- Brief description of the problem and the steps you took to solve it.

“+” is the (prefix) number you dial to make an international telephone call.

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